

AN EVALUATION OF THE PHYSICAL PROPERTIES AND PALATABILITY OF SOYBEAN FLOUR CAKE

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ABSTRACT

As a result of the high price and scarcity of wheat flour in Nigeria, soybean and various other products are being evaluated with a view to finding substitute for or at least cut down on the amount of the wheat flour used in the production of confectioneries.

This paper reports the result of a trial where two different levels of soybean flour were mixed with wheat flour and cake baked from the mixed flour were compared with 100% wheat flour cake.

The results show very favourable physical properties of the baked cake from the wheat/soybean flour mixture as compared with the 100% wheat flour cake. The flavour of the soybean flour cake was found not to be acceptable. The use of artificial flavour is therefore being proposed in the paper. The baked products were found to be quite acceptable.

Key Words: Evaluation, Soybean, Properties

INTRODUCTION

As a result of serious trade imbalance to the detriment of the Nigerian economy, the country's import bill became so unbearable, that the government of Nigeria has banned the importation of various items including wheat and wheat products. This ban on wheat products has caused the confectionery industries in Nigeria to look inwards for alternative raw materials.

Various products have been and are still being tested as substitute for wheat flour. One of these products is the soybean flour. Soybean is a leguminous plant that grows well in Nigeria. It contains very good quality protein (AERLS, 1982),

that is superior to all other plant food sources of protein. This property has caused soybean to be extensively used in various parts of the world to supplement other protein, especially those of cereals (Learmonth, 1956). The lysine content of soybean is higher than those of other cereals (Onochie, 1965).

Elsewhere, about 5% soybean flour is added to breads without adversely affecting the baking characteristics and makes combined proteins in bread more nutritious and comparable to the quality of proteins in milk or meat; yet it does not impair grain, loaf volume, texture and crumb colour. It also improves the eating quality through improved tenderness because of the moisture retaining

property (Ziemba, 1966). Martins (1966) reported the addition to 20-30% of wheat flour to soybean flour in bread recipe to include gluten.

The paper reports the result of a trial using two levels of soybean flour in addition to what flour at a ratio of 1:1 and 2:1 to bake cake and the quality of the cake.

MATERIALS AND METHODS

The soybean grains and the wheat flour used for this trial were purchased locally in the market. The dirt (pebbles, plant rests) as well as discoloured or damaged soybeans were removed and the rest washed in clean water. Thereafter, the soybean was covered with twice volume of water and boiled for thirty minutes, washed and drained. Twice the volume of water was then applied to the beans and left to soak for six (6) hours. The testa was then removed and the clean beans now dried in the sun until the moisture content was considerably lowered. It was then grinded at a local mill into fine flour.

Three samples were made at each trial. The 50% soybean flour mixed with 50% wheat flour (sample A); a level of 35% soybean flour and 65% wheat flour (sample B); and the control which had 100% wheat flour, (sample C).

All other ingredients remain the same as for the control. The recipe for control and methodology for cake making was as described by Anazonwu-Bello (1976).

There were three replications. Both subjective test and ink print test were done on each level. There were six persons on the taste panel of the subjective tests. The samples were rated for colour, texture, moistness, shape and flavour using 1 to 5 scoring scale (Appendix). The same people were used on the panel throughout the trials. The scores for each of the samples were then added together and a mean value found.

Ink prints were made for the objective test. After baking, the slice for ink print was taken half inch to the left and right from the centre of the triangular cake.

Ink was added to the stamp pad and the cut edge of the slice of each sample was firmly pressed on the well inked pad one after the other. The inked product was then transferred to the print paper and stamped firmly to make the print.

RESULTS AND DISCUSSIONS

The results of the subjective test done by the taste panel is presented in Table 1. From the result, it would be observed that sample A had the best colour (a very even golden colour) when compared to the other samples, while sample C appeared to be slightly better in texture than sample A and B. It must however be emphasized that other samples were acceptable texturewise especially sample A which is quite tender and almost spongy.

With respect to the moistness, the control would appear to be quite ahead of the two other samples (variables) while amongst the variables themselves, sample B is more moist than sample A. An indication that the inclusion of soybean gives a drier product. The panel however found the composite flour product quite acceptable in moistness.

The shape formation of samples A and B appear to be better than sample C, which is 100% wheat flour. However, the flavour of sample C was discovered to be superior to samples A and B. This was due to the characteristic beany flavour observed in samples with soybean.

The palatability of the products as shown by the verdicts of the taste panel shows that the control (sample C) is the most palatable, although the difference in palatability to the other products is not remarkable; an indication that these products are acceptable. Palatability of samples A and B have been ranked equal by the members of taste panel.

The results of the ink print (objective test) is reflected in Figure 1. From the results produced, it was observed that Sample C has given a more even porous print; an indication, that a lot of air had been incorporated into the cake during the

creaming period. Also sample C gives a more even spread of air bubbles than the other two samples an indication to a more tender texture and a confirmation of the results of the subjective test (taste panel). Unfortunately this test can only be used to investigate the tenderness of baked products.

The wheat/soybean flour products are no doubt acceptable. The beautiful golden brown colour of the baked products are by all means a good attribute to the acceptability of soybean flour confectioneries. A major setback appears to be the flavour which still carries the rather strong soybean characteristic flavour. This can very easily be improved by the addition of artificial flavour to taste.

Although sample A and B are good enough in texture, it would be difficult to go above the 50% level of soybean flour addition and still achieve a good texture of the baked product. Soybean lacks gluten and when used alone, the baked products are hard and brick like. This property will thus make the 50% soybean flour addition a quite acceptable upper limit, as the cost of baked products would have been considerably reduced.

The results of this trial tend to suggest a good acceptability of soybean flour baked products which can be improved upon by the use of artificial flavour.

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Table 1: Average score of the different samples

Parameters scored	50:50 Wheat flour soybean flour A	65:35 Wheat flour soybean flour B	100% Wheat flour (control) C
Colour	4.6	4.3	4.5
Texture	4.1	3.9	4.2
Moistness	3.5	3.7	4.0
Shape	4.1	4.4	3.8
Flavour	2.6	3.9	4.6
Palatability	4.1	4.1	4.4

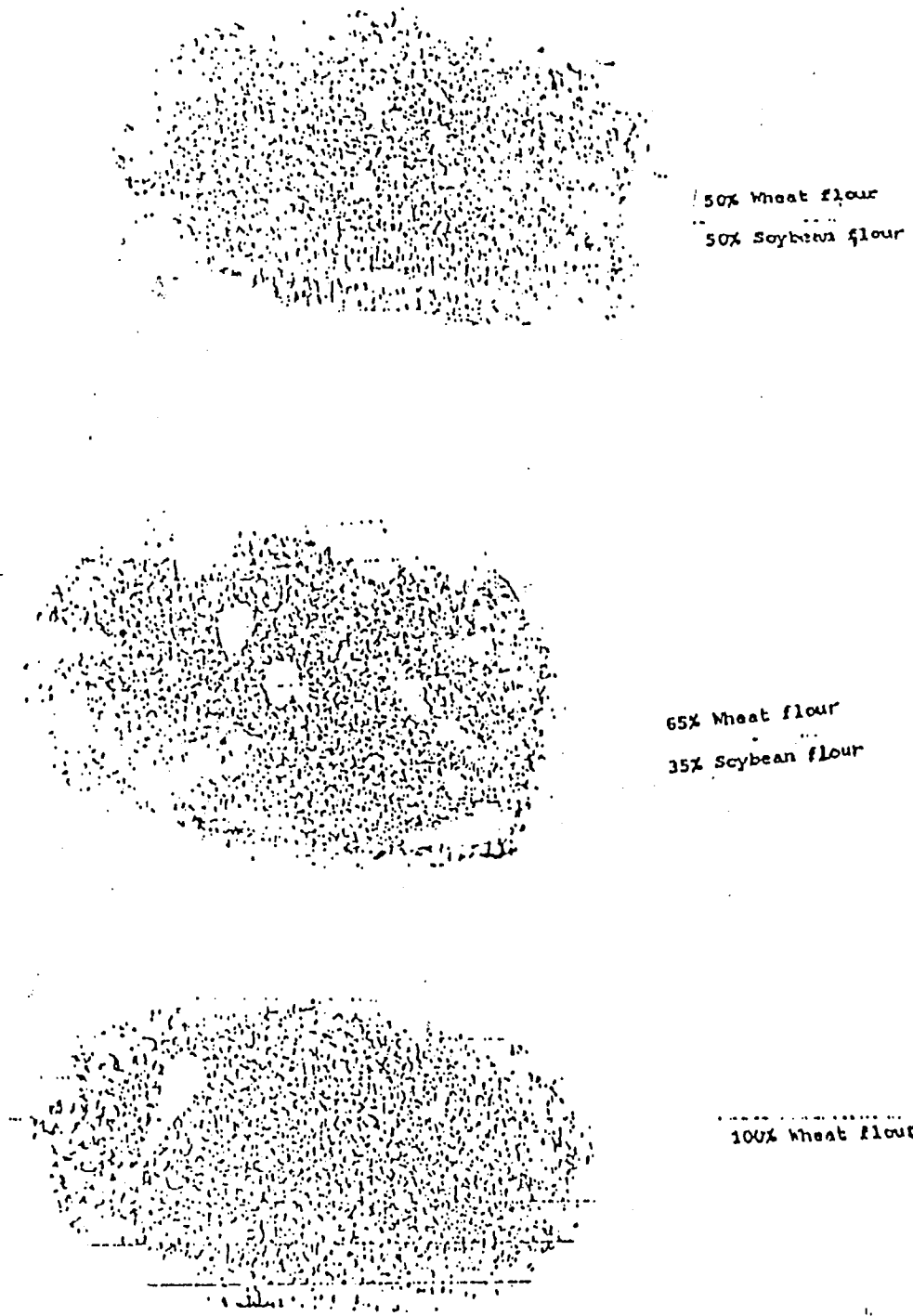


Fig. 1. Ink Prints of the Baked Products

Appendix 1: Score card for assessing soybean flour baked products

	Samples		
	I	II	III
Colour			
Texture			
Moistness			
Shape			
Flavour			
Palatability			

Scoring Key:

<u>Colour</u>	5	Even golden brown
	4	Unevenly golden brown
	3	Dark brown
	2	Slightly dark brown/slightly pale
	1	Pale
<u>Texture</u>	5	Tender and spongy
	4	Slightly tender
	3	Slightly tender but crumbly
	2	Slightly hard
	1	Hard
<u>Moistness</u>	5	Very moist
	4	Slightly tender
	3	Slightly tender but crumbly
	2	Slightly hard
	1	Hard
<u>Shape</u>	5	Evenly rounded top
	4	Slightly rounded top
	3	Peaks
	2	Depression
	1	Peak/depressed and cracks
<u>Flavour</u>	5	Very pleasing
	4	Slightly pleasing
	3	Acceptable
	2	Slightly off flavour
	1	Off flavour
<u>Palatability</u>	5	Very tasteful
	4	Tasteful
	3	Slightly tasteful
	2	Can be eaten
	1	Not at all palatable

Name Date